THE ALLOCATION OF POWER IN THE ENLARGED ECB GOVERNING COUNCIL

AN ASSESSMENT OF THE ECB ROTATION MODEL

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Abstract

T his study analyses the allocation of power in the Governing Council of the European Central Bank (ECB) as it enlarges to accommodate new members of the economic and monetary union. For this purpose, classical power indices that have their origin in solutions of cooperative games are applied. First, an assessment is made of the effects of enlargement on the voting power of different subgroups of the Governing Council that arise in the wake of the continuous accession process. Second, a systematic comparison is carried out of the status quo rule ('one member, one vote') with respect to the voting power of the ECB Executive Board and to the representativeness of European monetary policy, along with the potential for its re-nationalisation.

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Introduction

At the end of quite secretive discussions, the Governing Council of the European Central Bank (ECB) finally published its proposal for the reform of its decision-making process in early 2003. Meeting in Brussels on 21 March 2003, the heads of state of EU member countries approved the ECB's proposal on the rotation model. This unanimous decision came somewhat as a surprise to some analysts, in view of the heavy resistance to the proposal as late as the middle of March in countries such as Finland and the Netherlands, whose parliaments felt that it placed them at a disadvantage. Moreover, political acceptance of the proposal is by no means certain as all of the 15 national parliaments must still ratify the modification of the EU Treaty.

It is well known that the ECB's reform proposal consists of a 'minimum representation model', which combines elements of rotation as applied by the Federal Reserve's Board of Governors and elements of representation, i.e. the formation of country groups with group representatives following the examples set by the International Monetary Fund (IMF), the World Bank or the Bundesbank Council after German unification (see for example ECB, 2003). In this context, it is important to note that enhancing efficiency was not the main motivation for the introduction of the rotation principle in the Federal Open Market Committee. Instead, the voting power of regional governors was restricted in order to be able to run a common monetary policy for a common region instead of a monetary policy driven by regional interests. Most remarkably, the delegation of decision-making competences in the ECB to a small committee with only a few national representatives (delegation or centralisation) was not regarded as an option at all. It was consistently argued by the former President of the ECB, Wim Duisenberg (although questioned by European jurisprudence), that the wording of Art. 5 of the Treaty of Nice, along with Art. 10.2 and Art. 10.6 (the so-called 'enabling clause') of the statute of the European System of Central Banks prohibited a delegation or centralisation solution and limited the scope of Council reform to a mere change in the voting procedures. Supporting this view would imply accepting that the blueprint of the Treaty of Nice was flawed and that the present lopsided construction was owing to the lack of political power to correct the mistake.

By speeding up the process of passing the reform, the ECB Governing Council met two strategic targets at once. First, its own proposal could be completely discussed before the new members participated in the decision. Second, the ECB itself took the initiative to put forward a proposal and did not leave it, for instance, to the EU Commission. But how should the ECB's proposal be assessed?

- Without a doubt, the coming expansion of the euro area requires reform of the highest decision-making body of the European Central Bank, because otherwise the ECB Governing Council is going to comprise more than 30 members. The increase in the size of the Council will give rise to efficiency problems in the body that is responsible for the stability of one of the most important world currencies (i.e. a 'numbers problem' – see for example Berger, 2002).

- Unfortunately, according to a plethora of authors (e.g. Bofinger, 2003, Gros, 2003 and Meade, 2003b), the ECB's proposal seems to be even less preferable than the current

decision-making procedure in the ECB Governing Council, which is by no means optimally prepared for eurozone enlargement. The rotation model suggested by the ECB violates the fundamental principle of 'one member, one vote', which is intended to ensure that ECB Governing Council members participate in the Council's meetings personally and independently, and not as national stakeholders. The rotation model cultivates thinking in national terms, reduces the responsibility of the rotating members for monetary decisions and diminishes transparency. Furthermore, the cap on the total number of rights to vote at 21 is far too generous by international standards and will lead to more inefficiency in the decision-making process. In addition, the rotation model is inconsistent and contains arbitrary elements, such as the fact that the frequency of the voting rights' rotation is not explained and that a very small country such as Luxembourg will have a similar number of voting rights as Poland.

In this report, section 1 presents the ECB's reform proposal for the decision-making process in an enlarged eurozone, i.e. the minimum representation model. The remaining parts of this contribution offer an empirical assessment of the resulting shifts in power among the euro-area member states. For this purpose, section 2 introduces the power index concept and explains how to apply it to the new rotation model. Section 3 presents some algorithm-based results and compares them to the respective power indices prevailing in the status quo. Moreover, this section assesses whether the new rotation model serves the important principle of representativeness. Section 4 concludes and discusses further directions for research.

1.   Minimum Representation: The ECB's Reform Proposal

A (price) stability-oriented European monetary policy represents a collective good for the euro countries because a low and stable rate of inflation is the best precondition for investment, growth and employment. By contrast, a monetary policy prone to inflation may bring unemployment down in the short term but reduces medium- and long-term growth and employment. It is the central task of any monetary policy constitution to assure that a central bank like the ECB is not tempted to jeopardise a reasonable stabilisation policy because of the short-term demands of governments or well-organised lobbyists. In Europe, this constitution comprises: 1) the anchoring of the goal of price stability in the EU Treaty; 2) a concept of monetary policy that allows a viable policy of price stability as well as the documentation and verification of the ECB's willingness to maintain stability; and 3) the organisation of the monetary decision-making. Particularly the latter item is of central importance, because this is where the framework for daily decisions is laid down.

The necessity of reforming the decision-making process in the ECB Governing Council is beyond question (Berger, 2002). Under the prevailing body of rules, an expanded euro area would lead to a large ECB Governing Council that is hardly capable of acting. Including the six members of the Executive Board, the Governing Council would consist of more than 30 members. Guided by national interests, the latter would as a rule tenaciously struggle to arrive at day-to-day decisions. This absolute increase in the number of members of the ECB Council would in the end lead to efficiency problems. Another dimension of the problem is that the formation of coalitions among smaller euro-area member countries could lead to interest rate decisions that are not optimal for the euro area as a whole. The period of natural coalition among the governors of the larger member countries and the Executive Board, which in the first four and a half years of monetary union enabled consensus decisions, would end.

Finally, the discrepancy between the economic and the political weight of the euro member countries in the Council would even increase because of the fact that the new members tend to be (in economic terms) smaller in size. An overly strong representation of the acceding countries, which are characterised by higher inflation owing to the Samuelson-Balassa effect,

could lead to additional economic costs for the eurozone. According to some critics, these costs would consist of either higher inflation in the euro area (although the latter should not be estimated as very high, i.e. above 0.2 percentage points of total euro-area inflation) or higher nominal and real interest rates in the eurozone than otherwise (if the ECB reacts to this inflationary bias). Of course this argument heavily depends on whether there really are differences in motivation between the old member countries of the eurozone and the newcomers. Nevertheless, one should not be so confident that the core countries of the economic and monetary union (EMU) endanger the stability mandate of the ECB to a lesser extent than the new member states will do later on (consider, for example, the erosion of the stability and growth pact by Germany). The central question raised in this contribution is whether the ECB's reform proposal is able to handle and solve these future problems.

Based on the assumption of a future euro area with 27 member countries (the current 12 members, plus the United Kingdom, Sweden and Denmark, plus the 10 Central and Eastern European countries (CEECs) that joined the EU in 2004 and Bulgaria and Romania) the ECB's Governing Council would consist of 27 national central bank (NCB) governors and six directors. According to the ECB's rotation model, voting rights would in the end be divided as follows (see Table 1):

- The six directors would possess a permanent right to vote.

- The five biggest countries (Germany, France, Italy, the UK and Spain) would represent, according to the criteria, a five-sixth share of euro GDP at market prices and a one-sixth share in the aggregated balance sheet of the eurozone monetary financial institutions (MFIs). Together they would be allocated a total of four votes – i.e. these national central bank governors would have to suspend their voting right in one-fifth of the meetings.

- A total of eight votes would be assigned to the NCB governors of 14 middle-sized member countries. Thus, the participants of this group would be entitled to vote in only 57% of all decisions.

- The remaining eight NCB governors would only be allocated three rights to vote, which implies that these representatives would be suspended from 62.5% of the voting dates.

- Irrespective of their specific voting rights, all NCB governors would be able to participate in the discussions on the monetary policy of the ECB Governing Council.

- The problem of countries not joining the euro area at the same time was solved by forming two groups until the accession of the 22 members (Table 2).

Table 1. ECB rotation model – Voting shares and frequencies of voting (three groups)

		Number of governors in the Governing Council					
		22	23	24	25	26	27
Group 1	Voting shares	4/5	4/5	4/5	4/5	4/5	4/5
	Frequency of voting (%)	80	80	80	80	80	80
Group 2	Voting shares	8/11	8/12	8/12	8/13	8/13	8/14
	Frequency of voting (%)	73	67	67	62	62	57
Group 3	Voting shares	3/6	3/6	3/7	3/7	3/8	3/8
	Frequency of voting (%)	50	50	43	43	38	38
Sum		15	15	15	15	15	15

Source: ECB (2003, p. 79).

Table 2. ECB rotation model – Voting shares and frequencies of voting (two groups)

		Number of governors in the Governing Council					
		16	17	18	19	20	21
Group 1	Voting shares	5/5	5/5	5/5	4/5	4/5	4/5
	Frequency of voting (%)	100	100	100	80	80	80
Group 2	Voting shares	10/11	10/12	10/13	11/14	11/15	11/16
	Frequency of voting (%)	91	83	77	79	73	69
Sum		15	15	15	15	15	15

Note: Voting shares are defined as the number of voting rights/number of governors.
Source: ECB (2003, p. 78).

The implication of the ECB proposal in terms of the distribution of the voting rights between the Executive Board on the one hand and the small, medium-sized and large euro-member countries on the other hand can be best analysed (though rarely performed up to now) using the game-theoretical concept of power indices, which is presented from a theoretical perspective in section 2 and applied empirically to the ECB decision-making process in section 3. In this sense, this study reaches beyond the early, more narrative discussions of the adjustment of voting modalities in the ECB Governing Council (see for example Belke, 2003 and Gros, 2003).

2. How to Apply the Power Index Concept

The classical power indices that have their origin in solutions of cooperative games are often used to observe and quantify the allocation of power in a voting system. The distribution of power that is roughly defined as the influence of players on a voting outcome usually differs from the purely formal distribution of voting rights as has been shown in different studies (Owen, 1995, p. 460, Holler & Kellermann, 1978 and Leech, 2001a and 2001b).

In this context, simple games are used to study the distribution of power in different voting situations. These types of games are usually defined as a conflict in which the only objective is winning and the only rule is an algorithm to decide which coalitions are winning. Weighted voting games that are frequently used in voting schemes represent an important subclass of these simple games. Two power indices, the Shapley-Shubik index (Shapley, 1997) and the Banzhaf index (Banzhaf, 1965), have recently received the most attention in both theoretical literature and their application to political structures. Hence, we apply both indices to study the allocation of power in the Governing Council of the ECB in section 3. Nevertheless, both indices and the way to apply them to the problem of assessing voting power resulting from the rotation model is briefly explained below.

The Shapley-Shubik index ϕ_i of the player i can be written as:

$$\phi_i(N,v) = \sum_{i \in C; C \subseteq N} \frac{(|C|-1)(n-|C|)}{n!}[v(C) - v(C-\{i\})] \tag{1}$$

where $|C|$ is the number of the members of the coalition C, n is the general number of players, $v(C)$ is the return of coalition C and $v(C-\{i\})$ are the payoff of the coalition C after the exit of player i. Hence, the expression $[v(C)-v(C-\{i\})]$ defines the appreciation of the value of coalition C by the player i. To obtain the Shapley-Shubik value of player i, the marginal contributions of player i to all possible coalitions are summed up and weighted with the probability that player i is the last player who enters the coalition of the strength $|C|$.

In the calculation of the Banzhaf index, the order in which a player accedes to a coalition is not taken into account. Here the assumption of a simultaneous game is made and the number of coalitions for which a player is crucial to winning is of central importance without considering if the player is the last to enter the coalition. This requires knowing the number of swings for every player i, where a swing for player i is defined as a pair of coalitions $(C, C - \{i\})$ such that C is winning and $C - \{i\}$ is losing.

According to the Banzhaf concept, all coalitions are of equal probability. The players are indifferent with respect to their choice of the coalition partners. Hence, the calculation of the Banzhaf index results in dividing the number of swings that player i has, by the numbers of coalitions including player i.

$$\beta_i^* = \sum_{C \subseteq \Omega} \frac{[v(C) - v(C - \{i\})]}{2^{n-1}} \tag{2}$$

The concept of power indices has been frequently used to study the distribution of *a priori* voting power in different national and international voting systems. Dreyer & Schotter (1980) and Leech (2001a) published studies of power distribution in the IMF, while Owen (1995, p. 460) analysed the United Nations Security Council. The voting power of European institutions has also been the subject of many studies. Bilbao et al. (2002), Sutter (2001) and Widgrén (1994) estimated the power of member states in the EU Council, while the European Parliament was subject to a power index application in Lane & Maeland (2000). Yet the distribution of power in the ECB Council has been the subject of only a few studies, probably because of the triviality of the analysis of the one member-one vote rule. Actually, the reform of this decision-making body as proposed by the ECB results in a change of the equal distribution of the votes. Hence, the consideration of power distribution has become an important source of further insight on the impact of the reform of voting rights in the ECB Council.

Throughout this report we present the results of calculations based on *both* of the classical power indices with the aim of checking the robustness of our results. But we base our conclusions mainly on the results derived from the Shapley index, closely following the approach of Widgrén (1994) in this respect. He has argued that the Shapley power index is more applicable to voting bodies in which there is considerable communication among the voters and coalition formation is active. This condition is surely met by the ECB Governing Council, owing to, for example the informal meetings on the eve of the official sessions and the collegial definition of the voting body.[1]

In the following calculations, the decision-making in the ECB Governing Council is thus assumed to be a weighted voting game. Each of the NCB governors as well as the Executive Board is considered as one player. Furthermore, the following three assumptions are crucial. First, it is assumed that all the present members of the Governing Council cooperate over several meetings. After the reform of the ECB Council, according to the rotation model, the members of the Council will not be allowed to vote at every session. Nevertheless, all of them will still be present at each session. Hence, it seems plausible that the members will form coalitions that persist during several meetings.

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[1] Nevertheless, it could be argued that the application of the Banzhaf index is more appropriate because of its interpretation as an I-power index. An I-power index concerns voting behaviour motivated by 'policy-seeking', while a P-power index (e.g. the Shapley index) presupposes 'office-seeking' behaviour (see Fahrholz & Mohl, 2004, p. 6). We give the importance of the considerable communication a higher weight, but at the same time also refer to the Banzhaf index, which in almost all cases supports the results given by the Shapley index.

In decision-making, it is not decisive if a vote is formally taken. Of much greater importance is the possibility of using a vote on an average of several meetings. This strategy leads to an active formation of inter-temporal coalitions during the preparations for decision-making. For this reason, the decision-making within the ECB Governing Council is considered as an inter-temporally cooperative game in our approach.

The second assumption refers to the preferences and the voting behaviour of the players. The NCB governors are regarded as representatives of their countries, thus voting with a national bias. This assumption refers to the classical analysis by Meade (2003a, 2003b, p. 131 and 2003c, p. 2), who has shown that a national bias in the decision-making of the ECB Council cannot be excluded.[2] As long as the members of the Council are regarded as representatives of their countries because of their heritage, an incentive strengthened by the new rotation model, the suspicion persists that national aspects play an important role.

Finally, the third assumption defines the role of the Executive Board. In the following calculations the Executive Board is considered as one player with six votes. The reason for this assumption is that we focus on the allocation of power among the national representatives. As the Executive Board is frequently assumed to represent the interests of the whole euro area, this unanimity assumption appears to be highly plausible. Yet there is no *a priori* restriction in coalition-forming among the national central bank presidents.

The frequency of voting is interpreted as the inter-temporal weight. It enters the calculations as the voting weight of a player. Furthermore, a simple majority rule has been assumed for the calculations of the inter-temporal voting power, closely following the approach by Gruener (1998, p. 4). The numerous calculations have been made based on an algorithm originally developed by Bräuninger & König (2001), namely the Indices of Power IOP 2.0 programme. The figures presented in the following section are constructed in a consistent fashion: the x-axis displays the number of euro area member countries while the y-axis shows the relative voting right or the respective power index of the respective player (or both).

3.   Results

3.1   Relative voting share and power in the reformed ECB Council

The relative voting weights usually allow a first view of the allocation of power in the ECB Council. But these numbers also form the basis for the calculation of the more elaborated power indices. The numerical derivation of the voting shares and the resulting power indices can serve as the main ingredient of a detailed description of the characteristics of each of the voting rules compared in this study, i.e. the one person-one vote rule and the new rotation model. As a first step, the shifts of voting shares during an accession in a reformed ECB Council are investigated. As a second step, the results of the calculation of voting power for this case are discussed. In section 3.2, the results are compared with those derived for the status quo, the one person-one vote rule. Finally this comparison allows a comparative judgement about the usefulness and applicability of the new rotation model.

Under the rotation model, the relative voting weights do not change proportionally with each enlargement of the euro area. The relative voting weight of the Executive Board is stabilised at 6/21 and the voting weights of the national central bank presidents depend on the group to which the considered member of the European Central Bank Council can be counted, as can be seen in Figure 1. While the relative voting weight of a national central bank governor who is a

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[2] The assumption of nationally biased voting behaviour of national central bank presidents has also been applied in Bindseil (2001) and de Grauwe (2003, p. 21).

member of the first group falls only once as the Union is enlarged to 19 members, the relative weight of the members of the other groups changes almost with every accession.

As a result of the enlargement of the euro area, the relative voting weights of all groups fall as a trend, but for the members of group 2 a sudden rise in voting weight can be observed, i.e. when the 19th and the 22nd members accede. Figure 1 also clearly reveals the discrepancy between the relative voting weights of the members of different groups. The graph of group 1 is always located above the graphs for the other groups. Only once do the curves of groups 1 and 2 move closer to each other, whereas the relative voting share of group 3 is always visibly smaller.

Figure 1. Voting shares of national central bank presidents under the rotation model
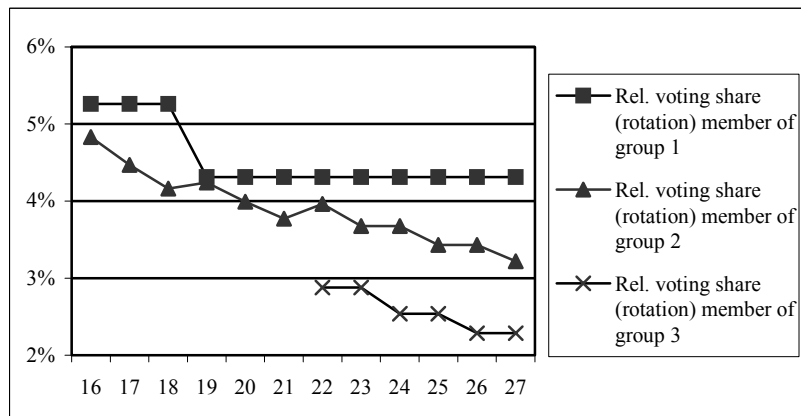
Source: Own calculations.

What are the consequences of this allocation of voting rights on the distribution of power among the different members of the Governing Council? One important characteristic of this reform proposition is the division of the presidents of national central banks into two or three groups with different frequencies of voting. The other important implication of the rotation model is the stabilisation of the voting share of the Executive Board. The allocation of power that results in the wake of this reform under the assumption that the Council members cooperate over several meetings is shown in Figure 2.

Figure 2. Power and voting shares of the Executive Board under the rotation model
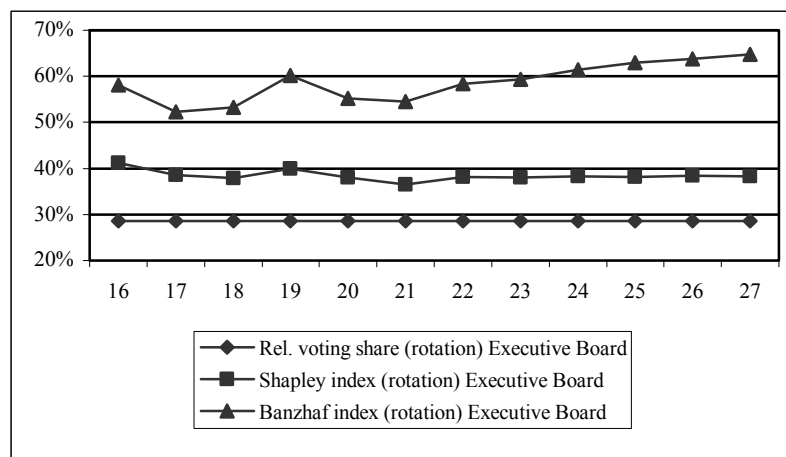
Source: Own calculations.

As revealed in Figure 2, the power index of the Executive Board is much less stable over time as could have been expected after examination of the relative voting shares. After the accession of the 17th member country, a sudden reduction of both power indices can be observed. The accession of the 17th country leads to an opposite reaction of power associated with the Executive Board, i.e. it rises. During the following accession both indices decrease. This trend is reversed after the accession of the 22nd member state to the euro area. In the midst of subsequent euro-area enlargement rounds, the Banzhaf index rises whereas the Shapley index remains relatively stable throughout the enlargement process, which prompts the question of why such changes occur.

In the first case, the power of the Executive Board decreases because the size of the Council rises without a reduction of the voting shares of group 1 members. But the accession of the 19th member country (in the second case) leads to a cut in the voting share in group 1 from one to four-fifths. The influence of the Executive Board thus rises because the members of group 1 cannot be as decisive for the coalitions as frequently as they could before. Yet the voting share of group 1 never shrinks below this mark of four-fifths. Hence, the power of the Executive Board drops until it is stabilised (in terms of the Shapley index) by the introduction of group 3 (after the accession of the 22nd member state), as a result of a reduction of the voting shares of group 2.

Before we discuss the results of the calculation for each group, Table 3 shows the relation between the power indices of the Executive Board and each of the NCB governor groups 1 to 3. It becomes obvious that the power of the Executive Board exceeds the power of the national central bank presidents by a factor between 8 (in relation to group 1) and 24 (in relation to group 3).[3]

Table 3. The relative power of the Executive Board under the rotation model

Member countries of the euro area:	16	17	18	19	20	21	22	23	24	25	26	27
Shapley index Executive Bd. Shapley index group 1	11.2	7.9	9.6	12.7	9.0	11.7	11.2	11.1	11.9	12.2	11.6	12.0
Shapley index Executive Bd. Shapley index group 2	11.2	12.5	11.6	12.7	13.9	12.2	12.7	13.8	13.9	15.2	15.6	16.1
Shapley index Executive Bd. Shapley index group 3	–	–	–	–	–	–	19.2	19.5	21.4	19.9	23.6	24.3

Source: Own calculations.

The development of the Shapley index of group 1, which is dependent on enlargement of the euro area, seems to be nearly opposite to that of the Executive Board, as can also be seen in Figure 3. The Shapley index rises suddenly as the 17th member state accedes to the euro area. Hence, it can be assumed that the members of the first group win the power lost by the Executive Board at this stage of enlargement. As could have been expected, the power of the representative members of group 1 decreases sharply after the accession of the 19th member state to the euro area, because at this point the voting rights are cut for the first time during the enlargement process.

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[3] If the Banzhaf index is considered instead, the differences are even larger. In this case, the Executive Board has 14 to 70 times more power at its disposal.

It proves to be more difficult, however, to explain the surprising rise of the Shapley index after the accession of the 20th euro-area member state. At this step of enlargement, power even exceeds the relative voting weight. As the votes of the Executive Board and the considered group do not change at this point, the shift in the distribution of power can only be explained through the decrease of the voting weights of the members of group 2. This shift in the allocation of voting rights changes the number of possibilities that are decisive in voting situations for group 1 members and raises their power in this specific scenario. After the next accession, the power of group 1 returns to the initial level again. The division of the NCB governors into three different groups does not affect the power of group 1 to a greater extent – it stays at a relatively stable level.

*Figure 3. Power and voting shares of a member of group 1 under the rotation model*
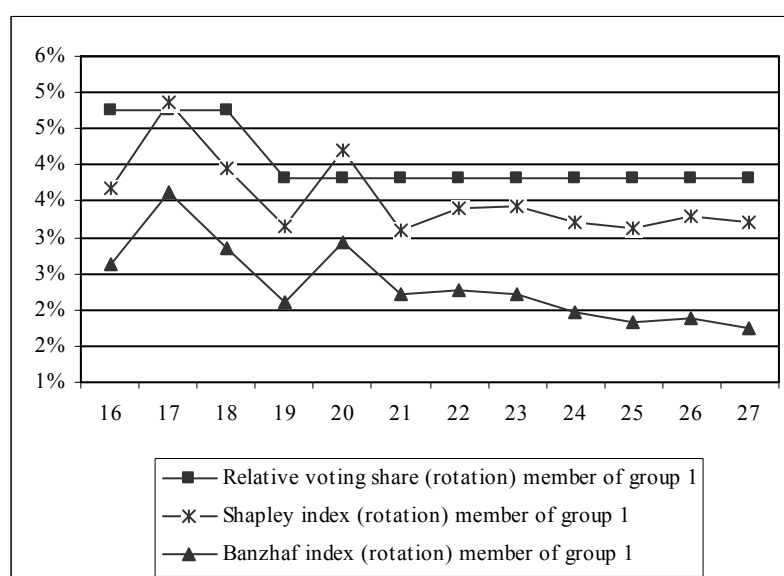
Source: Own calculations.

The development of the Banzhaf index reveals significant breaks at similar stages of the euro-area enlargement process as the Shapley index does (Figure 3). But the calculated Banzhaf values are lower throughout. This result explains why the curve appears to be a parallel shift of the Shapley curve. Only after the accession of the 21st member state do the curves seem to part from each other. While the Shapley value stays stable, the Banzhaf index decreases from this point onwards with each successive accession.

When discussing the allocation of power to group 2 (Figure 4), changes observed up to the accession of the 22nd member can be explained in a similar way. The only surprising change is the sudden rise in power after the accession of the 18th country. Despite the decreasing voting share, the power as indicated by both indices rises. Hence, this stage of enlargement can be interpreted as a favourable constellation of voting shares that aids group 2. This reminds us of paradoxes such as 'the paradox of redistribution' or 'the paradox of size' typically discussed in the literature on power indices.[4] After the accession of the 22nd country, the members of group 2 lose power continuously – their Shapley index decreases from 0.042 for a euro area comprising 20 member states to a realisation of 0.032 in the case of 27 members.

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[4] For a review of such paradoxes, see Holler & Kellermann (1978, p. 107).

Figure 4. Power and voting shares of a member of group 2 under the rotation model
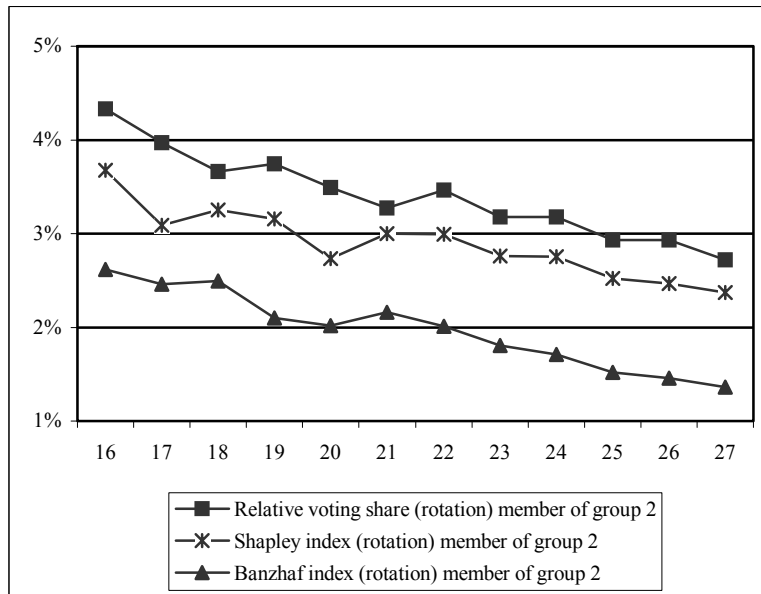
For group 3 a negatively shaped curve can also be observed (Figure 5). It is noteworthy that this group 3 emerges from the accession of the 22nd country. The members of this group have a lower share of the voting rights at their disposal than members of other groups and the power assigned to them is even lower than the voting share. During the enlargement process, their Shapley index decreases from 0.02 to 0.015 in the final scenario of the accession process. The power index of a representative member of group 2 exceeds the power of his or her counterpart in group 3 by two times in the final stage of a euro area consisting of 27 members.

Figure 5. Power and voting shares of a member of group 3 under the rotation model
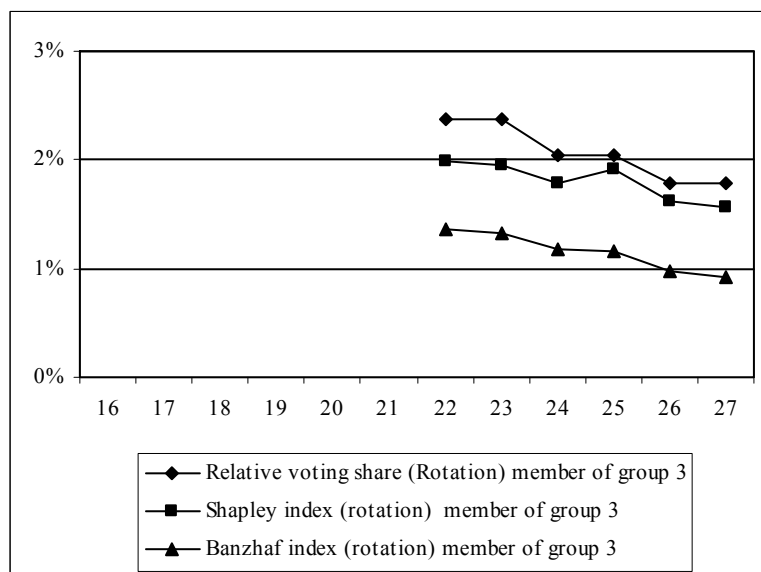
Have the observed voting shares thus been good indicators of the distribution of power within the reformed ECB Governing Council? The first hypothesis was that the power of the Executive Board would be stabilised by the reform. Our numerical application of the power index concept has shown that the position of this 'sub-Council' would not only be stabilised but also possibly strengthened. (This result is also confirmed by comparison to the power indices under the status quo rule.) The Shapley index of the Executive Board amounts to approximately 0.4 under all scenarios. This means that after the reform of the ECB decision-making process, 40% of the voting power devolves to the Executive Board.[5]

Our second hypothesis concerning the discrepancy between the power values of members of the different groups can be confirmed clearly. The five largest member states in the euro area in economic terms have between 19 and 24% of the voting power at their disposal. The medium-sized group, which has 11 to 14 member states, can exercise between 30 and 40% of the voting power, while group 3 with six to eight members has about 11 to 13% of the available voting power. But the consideration of the allocation of power has also revealed a new and unexpected feature of the rotation model. Surprising shifts of power between the groups have been observed, especially in the sequential enlargement scenarios prior to the construction of the three groups.

3.2 Comparison to the status quo: One person, one vote

In the previous section, the voting shares and power indices for all members of the Governing Council were presented under the assumption of the rotation model already being in place. The following comparison to the status quo (one person, one vote), however, is helpful in order to assess the changes that are generated by the projected reform. For this purpose, the voting shares and power indices in the unreformed European Central Bank Governing Council are first briefly reported. To check the robustness of our results, both the Shapley and the Banzhaf indices are indicated in some figures.[6] Nevertheless, our discussion predominately refers to the Shapley index.

For the unreformed Governing Council, under the one member-one vote rule each of the national central bank governors has one vote. Hence, their relative voting weight amounts to 1/N, with N as the number of all members of the Governing Council. As previously discussed, the Executive Board is regarded as one player; consequently the voting weight of this specific player is 6/N. If a continuous enlargement of the Government Council is assumed, N increases and the relative voting shares of every player fall. Figure 6 shows the power indices for the Executive Board and additionally its relative voting weight. It becomes obvious that all the displayed curves reveal negative slopes. But both indices show a higher power index of the Executive Board than could have been expected after the examination of the allocation of relative voting weights.[7] The voting power that is attributed to the Executive Board by the Shapley index exceeds the relative voting rights to a smaller degree than the respective power expressed by the Banzhaf index. The voting power shown by the first index is between 20 and 30% higher than the voting share, while the Banzhaf index reveals it to be between 45 and 60% higher. In both cases, the distance to the relative voting weights is reduced by each successive accession.

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[5] The numbers refer to the calculated Shapley values.

[6] The exact results are summarised in the Annex in Table A.3.

[7] The Shapley index is normally closer to the voting rights than the Banzhaf index, as discussed in Sutter (2001, p. 341).

Figure 6. Power of the Executive Board under the one member-one vote rule
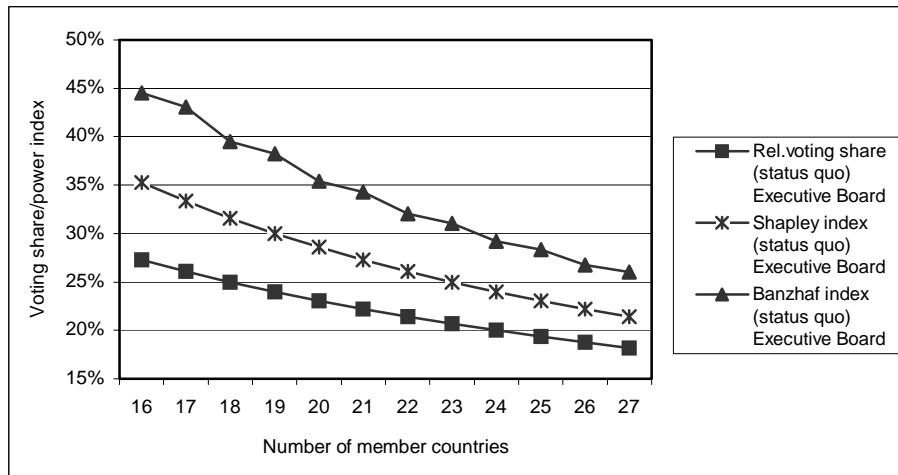
Source: Own calculations.

But what impact does this allocation of voting rights have on the distribution of power among the NCB governors? The presentation of the voting power and voting weights of the national central bank presidents in Figure 7 is very similar to Figure 6 at first glance, but a closer inspection immediately reveals that the curves have a different order. The NCB governors have less influence on the voting result than expected if relative voting weights are examined. Contrary to the results for the Executive Board, the Shapley indices now exceed the Banzhaf values.[8]

Figure 7. Power of national central bank presidents under the one member-one vote rule
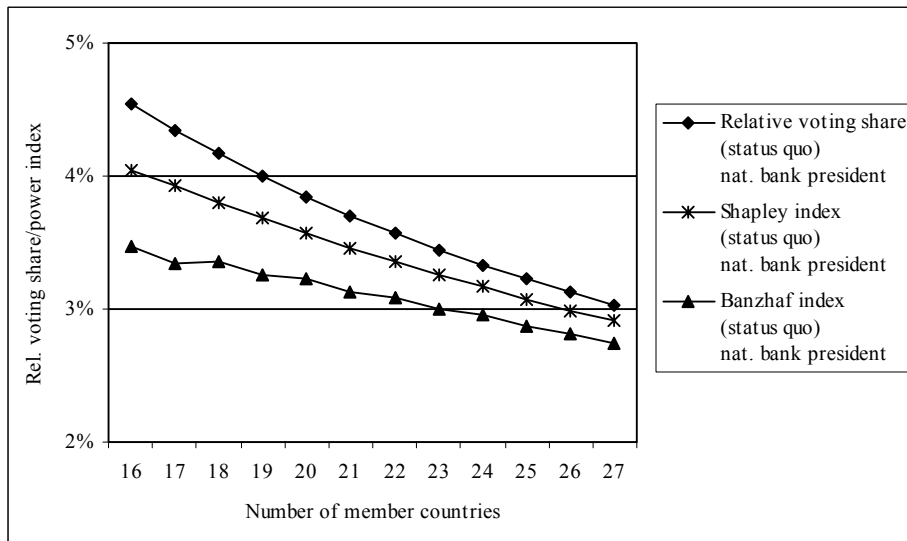
Source: Own calculations.

This result, however, does not come as a surprise because a number of empirical applications confirm that the voting power of the 'largest' player often tends to be higher than his or her

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[8] The explanation is that the indices can always be summed to 1 and the Banzhaf indices were higher for the Executive Board.

voting share. The opposite is true for the 'smallest' player, as discussed in Widgrén (1994, p. 1154). Here the Executive Board with six votes is the 'largest player' and its power is several times higher than the corresponding power values of an individual NCB governor. Under the status quo rule, the voting weights of the Executive Board are always six times higher than the voting share of a single NCB governor, while the difference between the respective power indices is even more considerable.

Figures 8 to 11 present a comparison of power indices resulting for each considered group of the ECB Council. In Figure 8, the realisations of the power indices of the Executive Board under the rotation model are compared with those under the status quo ante. It is clearly visible that the rotation model not only stabilises the power of the Executive Board, it even gains power after the reform proposed by the ECB: its Shapley index nearly doubles in the long term.

Figure 8. Power of the Executive Board (status quo and rotation)
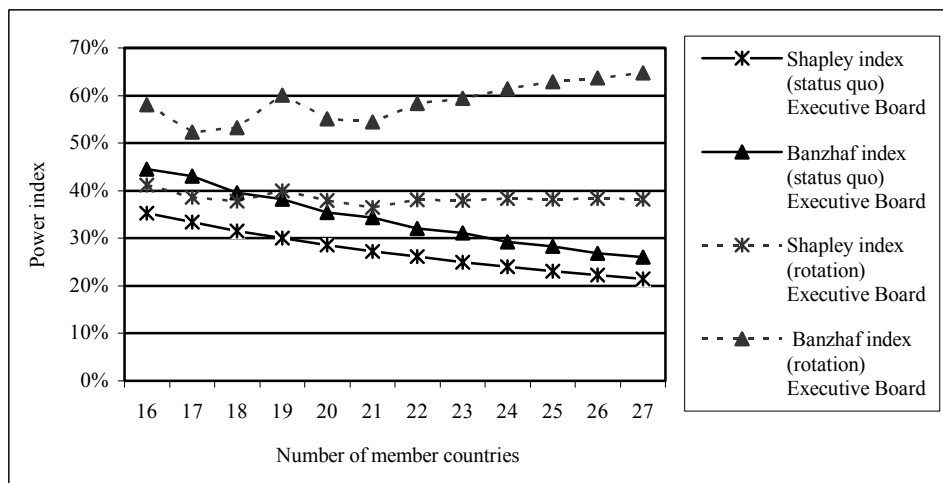
Source: Own calculations.

Figure 9. Power of a representative member of group 1 (status quo and rotation)
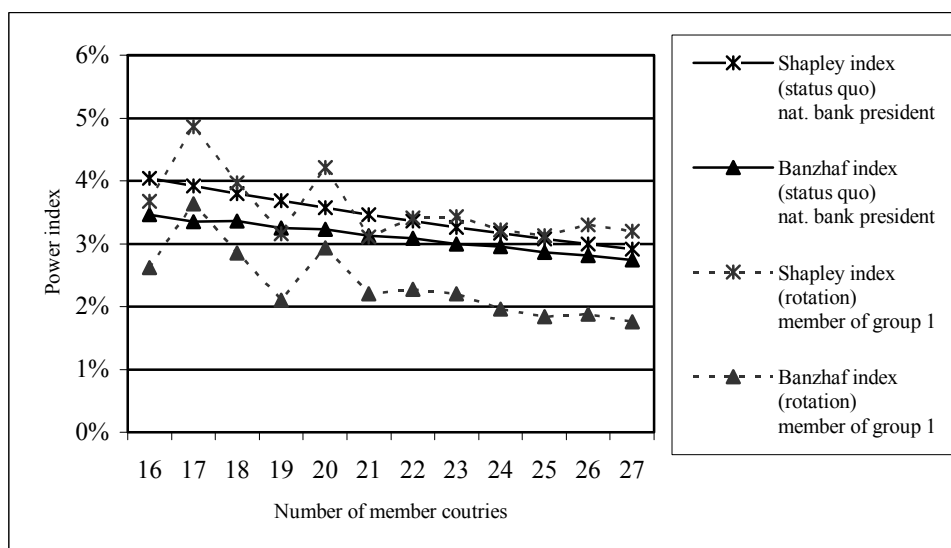
Source: Own calculations.

But not only the Executive Board benefits from the adaptation of the rotation model – the members of group 1 are vested with more voting power in the reformed Council in nearly all the accession phases as compared with their power in an unreformed Council (Figure 9). Hence, there are also groups who lose their ability to influence the voting outcome. In this case, the losers under the reform are groups 2 and 3, as demonstrated in Figures 10 and 11. Thus, the NCB governors of group 2 have to give up less power than the members of group 3. While group 2 members lose 10 to 20% of their initial power, the power indices of the NCB governors from the economically less important member states are between 38 and 45% lower than under the one member-one vote rule.

Figure 10. Power of a representative member of group 2 (status quo and rotation)
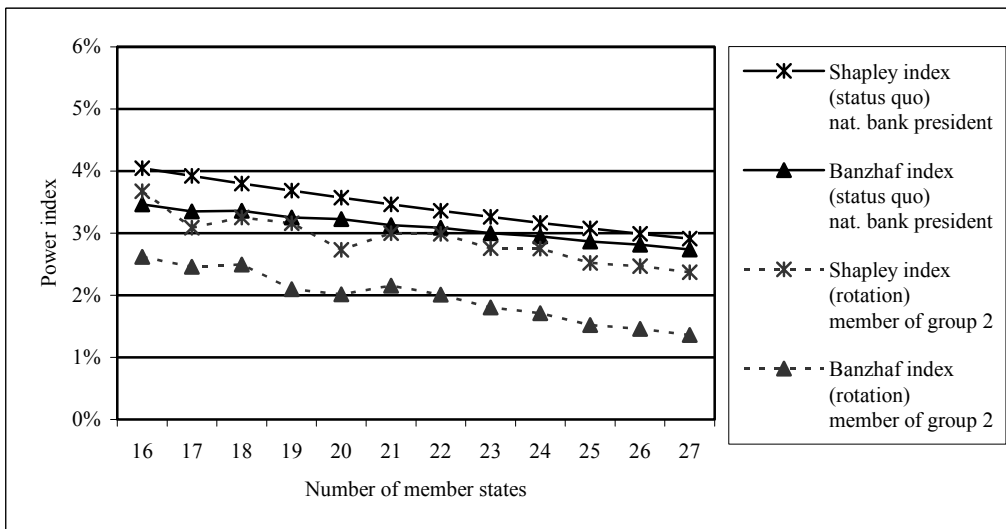
Source: Own calculations.

Figure 11. Power of a representative member of group 3 (status quo and rotation)

Source: Own calculations.

Figures 8, 9, 10 and 11 also show very clearly that in the reformed Council the enlargement of the monetary union leads to unexp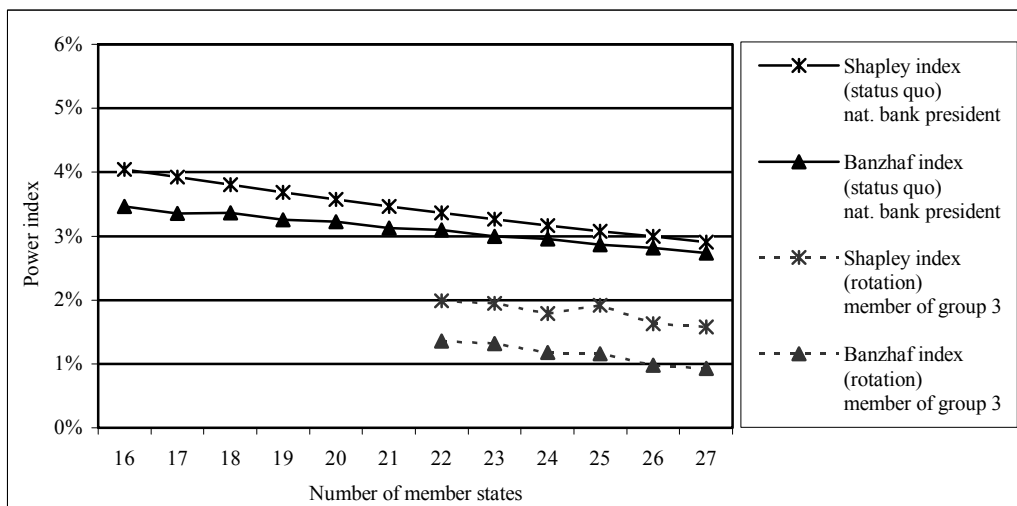ected shifts in the power of groups, as already discussed in the previous section. Here it is apparent that this development cannot be observed in the case of an unreformed Council. According to the preceding analysis, the rotation model cannot be considered as a robust voting rule, as the accession of new euro-area member states can lead to unexpected and probably unintended shifts in the allocation of power. One important implication for monetary policy-making is that these unexpected changes make it difficult for the public to form accurate inflation expectations as long as the accession process is incomplete. The prediction of the actual possibilities for forming a majority in a Council vote changes in a way that cannot be extrapolated from a mere visual inspection of the voting shares.

Thus seen on the whole, both positive and negative characteristics of the rotation model have been identified in the wake of our systematic comparison with the status quo. The strengthening of the Executive Board can be considered as a benefit. Its influence on the voting outcome is much more important within the reformed Governing Council. Hence, the representatives of the European perspective versus those with a national bias have a stronger standing in the reformed Council when compared with the status quo.

Nevertheless, the lack of robustness must be seen as a disadvantage of the rotation model. Given the new voting shares, it is impossible to predict how the relations of power will really change. This voting system cannot be judged as transparent, because intuition does not enable one to come to similar conclusions as those arrived at through the relatively complex calculation of power indices. Moreover, the fact that after reform of the Council the members of group 3 are the only members that lose considerable voting power confirms the suspicion that the present Governing Council wanted to protect its voting influence at the expense of the accession countries.

3.3 An assessment of the representativeness principle

In designing the precise features of the rotation system, the Governing Council was guided by some fundamental principles such as one member, one vote, *ad personam* participation, representativeness, automaticity and transparency.[9] In the following discussion, we only focus on the important principle of representativeness. Its justification by the ECB runs as follows.

The introduction of a rotation of voting rights could lead to situations in which the group of governors with a voting right are from member states that, taken together, may be perceived as not being sufficiently representative of the euro area economy as a whole. The new voting system, therefore, should be designed in a manner that would safeguard against such outcomes.

In order to achieve representativeness, governors might not be able to exercise their voting rights with the same frequency, with governors from the larger member states having the right to vote more frequently than those from smaller member states. At the same time, any reference to the country from which a governor comes should be made exclusively for the purpose of determining the frequency with which each governor exercises his or her voting right. Although the introduction of considerations of representativeness marks a departure from the existing provisions for voting in the Governing Council, this is solely motivated by the need to accommodate the impact of enlargement on the ECB's decision-making. For all governors exercising the voting right at any point in time, the one member-one vote principle should apply. Consequently, this differentiation should not affect actual substantive decision-making but should only be relevant in the process of determining who votes when.

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[9] See ECB (2003, p. 75); see also Bofinger (2003, p. 3) and Gros (2003).

In this section, one important aspect of this guiding principle of representativeness is examined. According to this definition, an ECB Council voting system meets this criterion if it minimises the discrepancy between the voting share and the respective economic weight of each of the member countries. As a modification of this definition, the discrepancy between the voting power and the economic weight and its development in the wake of the eurozone enlargement process is examined. More concretely, we analyse whether this difference is diminished through the implicit abandonment of the one member-one vote principle and its substitution by the rotation model. For this purpose, two figures are compared and presented in Figure 12.

Figure 12. The principle of representativeness – Power and GDP shares for the euro area-27
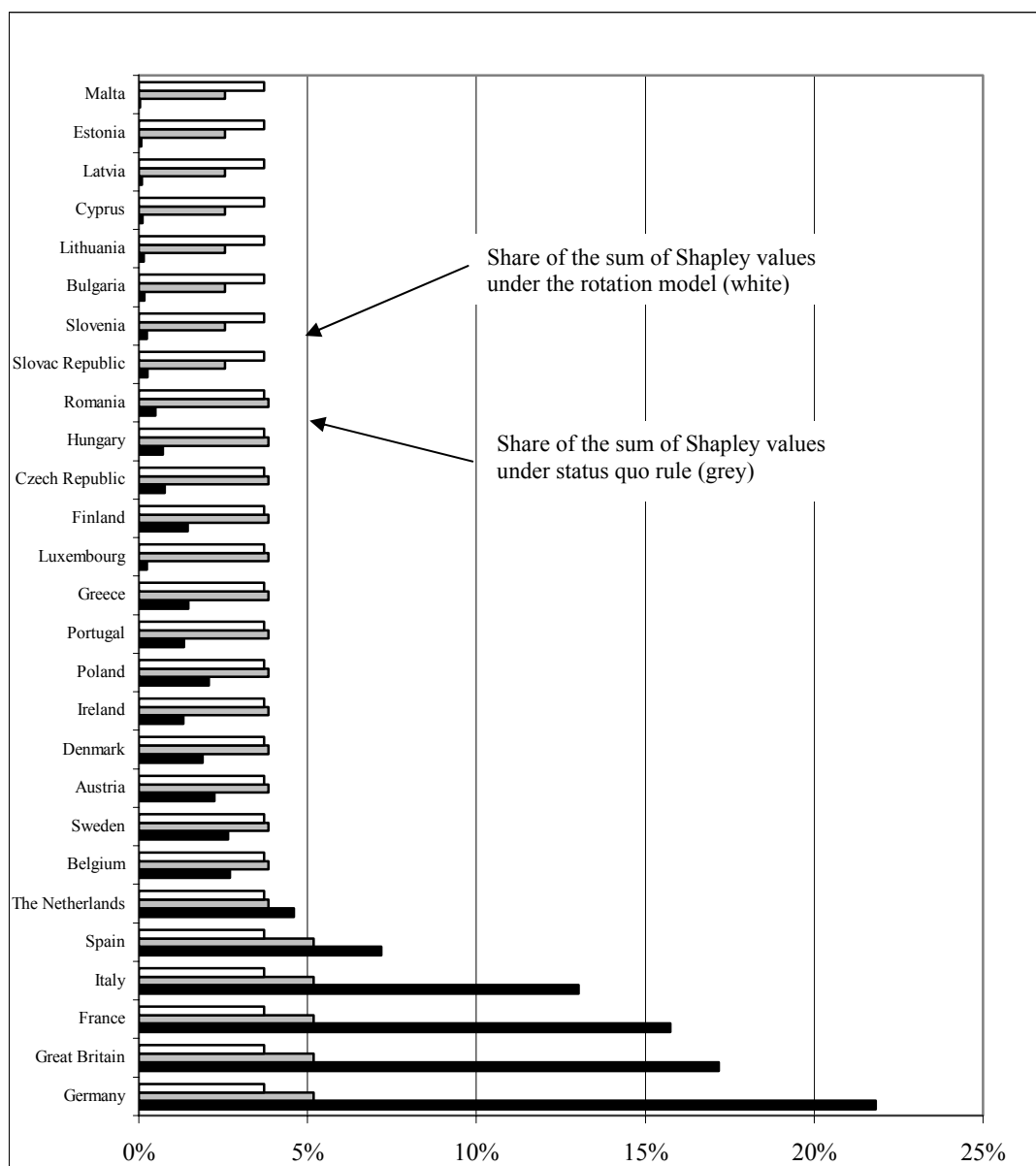
Note: The black bars denote the respective GDP share.

Source: Own calculations.

The first number expresses the relative voting power of a single NCB governor for each accession phase as presented in Amend (2003). The relative power is calculated as the voting power of an NCB governor divided by the power of all NCB governors, both expressed through the Shapley value.[10] As the second number, the GDP ratio of the respective country in the euro area GDP has been chosen as an approximation of the relative economic weight.[11] Both figures are compared in Figure 12 for each country in the case of a hypothetical euro area consisting of 27 member countries. The order of the countries is chosen to correspond with the ranking that results from the indicators proposed by the ECB.

A first inspection of Figure 12 allows the non-rejection of the hypothesis that the introduction of the rotation model (grey bars) leads to an improvement of representativeness because under the status quo rule (white bars) the difference between the economic weights and the political weights of member states is larger. Nevertheless, the differences between the power and GDP ratios of member countries are still large after the reform, especially so for the members of group 1.

Considering the sum of squared deviations enables a more exact comparison of the degrees of representativeness under the status quo rule and under the rotation model (Gros, 2003, p. 125). The sum results from the differences between the GDP weight and the relative power as measured for each member country. Table 4 shows the sums of squared deviations in four different scenarios of possible accession phases.

Table 4. Differences between the GDP-weight and the relative voting power – Squared deviations

	Squared deviation status quo	Squared deviation rotation
Euro area-17	0.12	0.09
Euro area-22	0.12	0.10
Euro area-24	0.12	0.10
Euro area-27	0.09	0.07

Source: Own calculations.

In each scenario, this sum proves to be smaller under the rotation model than under the status quo rule. The sum of the squares under the status quo in the case of a euro area consisting of 27 countries is 0.09. As already supposed after the examination of Figure 12, this sum is smaller under the rotation model at 0.07. Consequently, we feel justified to conclude that the rotation model leads to an improvement compared with the status quo concerning the criterion of representativeness. Nevertheless, even after the reform large differences between the shares in voting power and in GDP can be found. This result is comparable to the results discussed in the literature (e.g. Bofinger, 2003 and Gros, 2003) where only a slight improvement concerning this criterion is ascertained.

4.   Conclusions and Potential for Further Research

Our analysis of the inter-temporal power indices in the context of the ECB Governing Council has revealed and highlighted some interesting aspects of both the reformed and unreformed voting system. One negative feature of the proposed voting reform is the sharp shift of the allocation of power during the early euro-area accession phases. This shift could have negative

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[10] See also Table A.2; with this definition, we closely follow Berger (2002, p. 12) and Gros (2003, p. 125).

[11] Table A.1 summarises the GDP data for EU member states and candidate countries.

effects on the transparency of ECB decision-making and may result in a bias of inflation expectations. The second aspect of the rotation model that comes at a cost is the fact that the reform leads to a voting system where especially the acceding countries lose influence on the voting result compared with their voting power under the status quo. This could lead to a re-nationalisation of monetary policy in the euro area.

One benefit associated with the reform, however, is the higher degree of representativeness it would entail. But this effect is numerically very small and thus should not be overvalued. A further more important result is that the voting power of the Executive Board would be considerably strengthened through the reform. Under the quite realistic presumption that the Executive Board represents the interests of the euro area, this result tends to come as a benefit. In this case, the rotation model could have a stabilising effect on inflation expectations, which would alleviate the negative impact of the sudden shifts of power allocation. Moreover, European versus national aggregates could be more easily accepted by the public as an anchor for setting inflation expectations.

Yet this is not the first study of the new rotation model based on power indices. We are aware of one other study in the field, namely the recent study by Fahrholz & Mohl (2004). Despite the methodology that is common to both studies, Fahrholz & Mohl arrive at different conclusions. They find that the power of the Executive Board diminishes as a result of the introduction of the rotation model, whereas in our study the opposite appears to occur. The assumptions underlying each of the two approaches may be one explanation for this difference. These assumptions build the core basis for the calculations of power indices and hence have a decisive effect on the results.

In our study, each national central bank governor is assumed to be a separate player and to follow a national perspective while the Executive Board is modelled as one player owing to the assumed common orientation towards European aggregates. By contrast, the analysis by Fahrholz & Mohl not only models the Executive Board but also each of the groups of national central bank presidents, which emerge after the reform as one player. In our view, however, there are some significant counter-arguments against the view that the NCB presidents will vote in a common fashion simply because they are part of a group (Belke, 2003 and Meade, 2003a, 2003b and 2003c). For instance, for two large countries that clearly belong to group 1 under the scenario of a euro area-27, namely Germany and the UK (with its cycle connected more closely to the US cycle than that of the euro area), the business cycle pattern may not be exactly synchronous.

Further, there are other potential caveats with respect to the assumption of homogeneity among group members. First, the rotation procedure violates the central principle of one person, one vote, as the latter will only apply to those national central bank governors who are allowed to vote. The principle is put at risk in two ways: 1) the countries are weighted and 2) the rotation takes place with a different frequency for each group. Thus, the reform proposal does not meet the ratio of an integrative monetary policy. The renunciation of this tenet at best foments thinking in national terms. In other words, it re-nationalises European monetary policy.

Second, the principle of personal and independent participation in the Governing Council, the so-called '*ad personam* participation', is impeded by the rotation model. Safeguarding this principle, which was eminently successful in case of the German *Landeszentralbanken*, was the main motivation and legitimisation of the principle of one person, one vote. In this bloated, reformed ECB Governing Council, each national central bank governor will experience that it is mainly his or her national provenance that will play a role in monetary decision-making and not his or her personality as a monetary policy expert. This experience will most probably induce each governor to make decisions from a more national perspective. Such an incentive will finally challenge the independence of the decision-making process in day-to-day executions

within the European Central Bank. Therefore, a rational monetary policy according to the stability goal becomes vastly complicated. Nevertheless, the different approaches taken by this study and the analyses of Fahrholz & Mohl offer a very fruitful field for further research.

It is also conceivable to extend the approach taken in this study to certain aspects of decision-making in the Governing Council, such as the modalities of decision-making. For instance, it is well known that both the tradition of deciding in a consensual fashion and the agenda-setting power of the Executive Board are the main ingredients of the meetings of the ECB Council. Von Hagen (2003, p. 108) has taken these aspects into account in his analysis of the Governing Council prior to the reform. He essentially applies the median voter model to investigate what impact the traditional terms of decision-making have on the results of monetary policy. New insights could be gained if the rotation model is analysed along these lines.

As a further possibility of extending our analysis, the monetary policy preferences of national central bank presidents could be included. The inclusion of such preferences in the analysis would make it possible to identify likely coalitions among Governing Council members who represent similar interests. The probability models used in the studies that model the Governing Council could be modified in accordance with information about the probabilities of certain coalitions forming. This could be achieved by defining the subsystems within which coalitions are joined with a higher probability. This approach was first used in Owen (1977) and has been applied to the EU Council in Widgrén (1994, p. 1154). In a similar fashion, this approach could be used to register the subsystems inside the Governing Council, wherein the Executive Board could be defined as one subsystem. Analogously, those groups of national central bank presidents whose home countries traditionally have similar business cycles could also be modelled as subsystems.

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Annex

Table A.1 GDP of EU member and candidate countries (€ millions)

Country	GDP
Germany	2,108,200.00
Great Britain	1,659,111.90
France	1,520,804.00
Italy	1,258,349.00
Spain	693,925.00
The Netherlands	444,033.00
Belgium	260,744.00
Sweden	255,423.10
Austria	216,830.50
Denmark	182,799.80
Ireland	128,187.40
Poland	200,198.00
Portugal	129,187.60
Greece	141,132.00
Luxembourg	22,340.50
Finland	139,734.00
Czech Republic	73,874.80
Hungary	69,888.90
Romania	48,361.80
Slovakia	25,147.00
Slovenia	23,385.10
Bulgaria	16,583.00
Lithuania	14,649.40
Cyprus	10,762.20
Latvia	8,940.20
Estonia	6,904.00
Malta	4,096.60

Source: Eurostat (2003a and 2003b).

Table A.2 Representative national central bank presidents' shares of the sum of Shapley values of all national central bank presidents

	16	17	18	19	20	21	22	23	24	25	26	27
Group 1	0.063	0.079	0.0638	0.0526	0.0678	0.0489	0.0552	0.0554	0.0522	0.0506	0.0536	0.0517
Group 2	0.063	0.05	0.0524	0.0526	0.0441	0.0472	0.0483	0.0445	0.0447	0.0408	0.0401	0.0384
Group 2	–	–	–	–	–	–	0.0321	0.0315	0.029	0.031	0.0264	0.0255

Source: Own calculations.

Table A.3 Derivation of voting weights and power indices (rotation and status quo)

	16	17	18	19	20	21	22	23	24	25	26	27
Rel. voting share (status quo) Executive Board	0.2727	0.2609	0.2500	0.2400	0.2308	0.2593	0.2143	0.2069	0.2000	0.1935	0.1875	0.1818
Shapley index (status quo) Executive Board	0.3529	0.3333	0.3158	0.3000	0.2857	0.2727	0.2609	0.2500	0.2400	0.2308	0.2222	0.2143
Banzhaf index (status quo) Executive Board	0.4454	0.4305	0.3952	0.3824	0.3541	0.3431	0.3202	0.3106	0.2918	0.2834	0.2677	0.2603
Rel. voting share (rotation) Executive Board	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857	0.2857
Shapley index (rotation) Executive Board	0.4118	0.3858	0.3788	0.4000	0.3794	0.3647	0.3810	0.3800	0.3832	0.3820	0.3842	0.3826
Banzhaf index (rotation) Executive Board	0.5807	0.5232	0.5328	0.6013	0.5513	0.5447	0.5834	0.5939	0.6138	0.6291	0.6376	0.6472
Shapley index (status quo) nat. central bank president	0.0404	0.0392	0.0380	0.0368	0.0357	0.0346	0.0336	0.0326	0.0317	0.0308	0.0299	0.0291
Banzhaf index (status quo) nat. central bank presidents	0.0347	0.0335	0.0336	0.0325	0.0323	0.0313	0.0309	0.0300	0.0295	0.0287	0.0282	0.0274
Rel. voting share (status quo) nat. central bank presidents	0.0455	0.0435	0.0417	0.0400	0.0385	0.0370	0.0357	0.0345	0.0333	0.0323	0.0313	0.0303
Frequency of voting group 1	5/5	5/5	5/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5
Rel. voting share (rotation) group 1	0.0476	0.0476	0.0476	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381	0.0381
Shapley index (rotation) group 1	0.0368	0.0487	0.0396	0.0316	0.0421	0.0310	0.0342	0.0344	0.0322	0.0312	0.0330	0.0319
Banzhaf index (rotation) group 1	0.0262	0.0363	0.0285	0.0210	0.0293	0.0220	0.0228	0.0220	0.0196	0.0184	0.0188	0.0176
Frequency of voting group 2	10/11	10/12	10/13	11/14	11/15	11/16	8/11	8/12	8/12	8/13	8/13	8/14
Rel. voting share (rotation) group 2	0.0433	0.0397	0.0366	0.0374	0.0349	0.0327	0.0346	0.0317	0.0317	0.0293	0.0293	0.0272
Shapley index (rotation) group 2	0.0368	0.0309	0.0325	0.0316	0.0273	0.0300	0.0299	0.0276	0.0275	0.0252	0.0247	0.0237
Banzhaf index (rotation) group 2	0.0262	0.0246	0.0250	0.0210	0.0201	0.0216	0.0201	0.0181	0.0171	0.0152	0.0146	0.0136
Frequency of voting group 3	–	–	–	–	–	–	3/6	3/6	3/7	3/7	3/8	3/8
Rel. voting share (rotation) group 3	–	–	–	–	–	–	0.0238	0.0238	0.0204	0.0204	0.0179	0.0179
Shapley index (rotation) group 3	–	–	–	–	–	–	0.0199	0.0195	0.0179	0.0192	0.0163	0.0157
Banzhaf index (rotation) group 3	–	–	–	–	–	–	0.0136	0.0132	0.0118	0.0116	0.0098	0.0093

Source: Own calculations based on the Indices of Power IOP 2.0 algorithm by Bräuninger & König (2001).

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